

The Cary Arboretum



of The New York Botanical Garden

A Newsletter published for Friends of the Arboretum
by the Public Affairs Department.

July - August 1977

Box AB
Millbrook, N.Y. 12545

Volume III, Number 4

UHV Transmission Lines — A “Hot” Issue

By Gus Tillman, Wildlife Ecologist

Ultra-high voltage (UHV) transmission lines have become a significant and heated issue for discussion in New York State, especially along a narrow corridor extending from the St. Lawrence River to the Pleasant Valley Substation in Dutchess County. This corridor has been designated as the primary route for the first 765,000 volt transmission line (765 kV) in New York State. Segments of the line, destined to transmit surplus Canadian electric power to southern New York markets, are currently in varying stages of planning, construction, or completion. A portion of the power line, from the southern Adirondacks to Albany, already has been completed and is carrying electricity, but at a reduced voltage of 345 kV. A longer segment, from the Massena Substation on the St. Lawrence to the southern Adirondack terminus, is presently under construction, while the final link from Albany to Pleasant Valley is still in the early planning stages. The recent construction and planning announcements have stirred heated controversy in Adirondack and Hudson Valley communities. Opposition to the massive power lines centers around two critical issues — esthetic considerations and biological effects.

Esthetic Effects

Understandably, citizens express concern over route selection and placement of the 150-200-foot towers, especially if the transmission lines are placed in full view of residential areas or highways, or if they disrupt vistas of high scenic value. Unfortunately, federal and state guidelines recommend that new transmission lines be constructed parallel to existing rights-of-way unless extenuating circumstances do not allow this placement. Early low voltage lines, often placed in rural areas, were not usually disruptive because human population densities were low and the structures were relatively small. As the transmission voltages increased over the years from 69 kV, to 138 kV, to 345 kV, the structures became more massive and rights-of-way became wider. At the same time, population shifts changed the rural areas into suburban developments, often in full view of the power lines. Because these early lines were designed for expediency, they often parallel busy highways that were once rural roads, or they now traverse exposed hillsides or present visual scars on an otherwise attractive site.

Transmission lines can be planned and constructed to be unobtrusive, either by avoiding sensitive areas or by taking advantage of topographic and vegetative

screens. Recent high voltage lines have been constructed in the Northeast that have been planned and designed to minimize visual impact and can only be seen by low level airplane flights, in spite of passing through highly populated suburban areas. Design input by environmentalists and landscape architects can minimize visual effects and should be a requirement for the right-of-way design for all EHV (230kV-345kV) and UHV (500kV-765kV) transmission lines.

Biological Effects

The most significant issue concerning UHV transmission lines is the unresolved problem of the potential biological effects caused by the low frequency electric field or by ozone generation. Several studies have been conducted that suggest potentially dangerous biological effects, but these are countered by other research efforts that fail to demonstrate any harmful effects of ultra high voltage transmission. The only common ground is the general agreement that additional research should be conducted to answer the vexing questions concerning the biological effects of 765 kV lines.

Electric Field Effects

The transmission of electricity along a conductor produces an electric field surrounding the conductor, and as the transmission voltage is increased, the size and intensity of the electric field is proportionally increased. Many scientists feel that the intensity of the electric field that surrounds UHV lines may cause significant, long-term biological effects on persons exposed to the electric field for prolonged periods of time. It has been suggested that the low frequency electric fields may interfere with normal cellular metabolism, possibly producing adverse consequences such as reduced heart beat, lowered blood pressure, anemia, tremors of the extremities, and reduced sexual vigor. In fact, research conducted in the Soviet Union on linemen working in high voltage switchyards has demonstrated these general symptoms. On the other hand, similar research efforts by utilities in the United States have failed to confirm the Russian results. To date, the research efforts on electric field effects have neither been coordinated nor developed to the point where the results can be viewed as conclusive.

Ozone Effects

It is a well-known fact that transmission lines and other electrical apparatus generates

ozone, a highly toxic gas that does produce adverse effects at relatively low concentrations on both plants and animals. The amount of ozone generated by transmission lines increases with increased voltage, age of the conductor, humidity or atmospheric moisture and with physical disturbances such as rust on the surface of the conductor. While all concerned parties recognize the hazards of high ozone concentrations, there is serious disagreement between the utilities and environmentalists as to the concentration of ozone that can be attributed to transmission lines. The lack of impartial research leaves the issue unresolved at this point. Utility companies have taken measurements that show that ozone levels adjacent to high voltage lines do not exceed federal standards. The environmentalists counter these results with measurements that show unsafe levels of ozone which they claim can be directly attributed to transmission lines. The lack of sophisticated and impartial research on this critical issue is quite alarming, especially to citizens who may be forced to live in close proximity to the power lines or substations.

New York State Hearings

While conducting hearings on 765 kV lines proposed by Niagara-Mohawk Corporation and the Power Authority of the State of New York (PASNY), the New York State Public Service Commission (PSC) elected to hold exhaustive generic hearings on UHV transmission lines. After months of testimony, exhibits, and demonstrations by national experts, the Commission gave permission for the construction of a 765 kV line, but at the same time it refused to certify the line for transmission above 345 kV until further studies have been conducted. This seems to be the most reasonable approach to the problem. If the safety of 765 kV transmission can be ensured, the Commission then can grant permission to transmit at ultra high voltages. Should additional research indicate adverse effects, the utility will be able to continue transmission at the lower, safer voltages. The Commission's action represents a compromise between extreme groups, for the benefit of the general public. Until definitive research results are presented, the safer course seems to be our best and wisest option.

Dr. Tillman edited the recently published book "Proceedings of the First National Symposium on Environmental Concerns in Rights-of-Way Management," Mississippi State University, 1976.

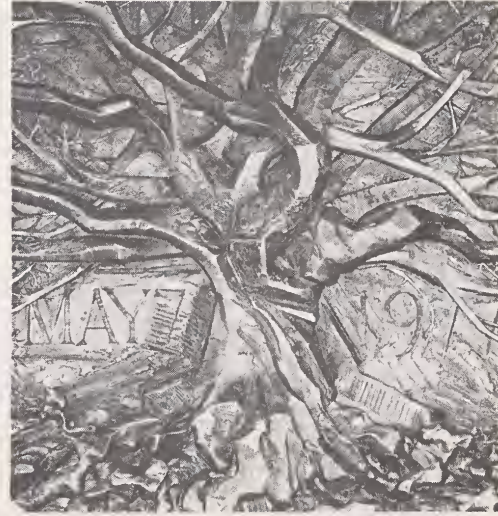
Plant Science Building Gets Federal Grant After Corner Block Ceremony

A beautifully designed bronze plaque mounted on a block of wood was installed at the entrance of the Arboretum's Plant Science Building, with appropriate ceremony, on May 7, 1977. And a few days later news came from Washington that the solar-heated, environmentally planned building has been

judged deserving of official Federal support — in the form of a matching grant from the U.S. Energy Research and Development Administration for \$122,229. The funds will help defray the added expense of the solar system now being installed in the building. Occupancy is expected in the Fall.



Peter Berle, Commissioner of the New York State Department of Environmental Conservation, was the principal speaker. Congressman Hamilton Fish, Jr., also on the program, listens intently as Berle praises the Arboretum's foresight in planning the energy-saving structure.



Commemorative plaque, cast in bronze, was designed by Kappy Wells, a New York sculptress, and daughter of building's architect, Malcolm Wells.



Commissioner Berle scores a solar point in his address at corner-block ceremonies. After a picnic lunch, several hundred guests toured Arboretum facilities.



Cary Trustee Herbert J. Jacobi speaks on behalf of the Trust to the crowd of more than 400 guests. Also on platform (l.-r.) are Dr. Willard W. Payne, new Arboretum director; Donald J. Bruckmann, chairman of Botanical Garden board, Dr. Howard S. Irwin, NYBG president; and Commissioner Berle.

Arboretum Starts Planting Specimen Tree Collection

The Arboretum's long-range horticultural program took a giant step forward recently when approximately 130 trees, ranging in height from 6 to 14 feet, were planted in selected areas on the grounds.

Some of the specimen trees can now be seen along a one and one-half mile stretch of internal roadway in the lowland area west of Fowler Road. According to Robert Hebb, staff horticulturist, this area eventually will be the Arboretum's "major tree avenue," with matching pairs of each species every 60 feet. "It will be like a living museum of many of the major deciduous tree species suitable for this area," he said. "In years to come, when the trees reach maturity, they will touch each other and form a green canopy along the entire roadway."

Many of the young trees were started in the nursery/greenhouse from seed or cuttings acquired about five years ago by means of the Arboretum's seed exchange program. Others were donated to the Arboretum in 1972, while a few species were purchased as seedlings.

Both common and unusual species of deciduous trees are being planted. The "major tree avenue" — officially designated as Redwing Drive — will contain, among others, Tulip trees (*Liriodendron tulipifera*), Plane trees (*Platanus x acerifolia*), and the less common Japanese Zelkova (*Zelkova serrata*). A number of maples will also be featured, including Norway maple (*Acer platanoides*) and Sycamore maple (*Acer pseudoplatanus*). Eventually, the avenue will be planted with nearly 100 different tree species.

In addition to the trees along Redwing Drive, 25 maples, representing 12 different species, already have been planted in a special collection area on the west side of Fowler Road and are visible from the road. The maple planting will be expanded as the collection, now being grown in the nursery, matures.

A pine collection has been started uphill from the present Education Building (the Leland Lovelace house) with three examples of Black pine (*Pinus thunbergii*). This is



the nucleus of what will eventually be a large collection of pines.

The north and south ends of the attractive pond at the Armand Lovelace residence have been planted with flowering trees, placed so that their blooms will reflect in the water. Varieties used here include six Sargent cherries (*Prunus sargentii*), two smaller Yoshino cherries (*Prunus yedoensis*), and two magnolias (*Magnolia x soulangiana*). Also, two Bald cypress (*Taxodium distichum*) were planted at the water's edge.

A small group of pecans (*Carya illinoensis* 'Colby') have already been planted along Cary Drive on the upper internal roadway, and a disease resistant Oriental elm (*Ulmus* hybrid) has been placed outside the Plant Science Building. Plantings scheduled for the remainder of the current season include sycamores (*Platanus*) in the lowland area near Patriots Bridge, the southernmost of the two bridges that span Wappingers Creek.

Second Exchange Visits With Russian Botanists

The second exchange of botanists between the United States and the Soviet Union will take place this summer and fall, under arrangements made by Dr. Thomas S. Elias, an Assistant Director of the Cary Arboretum, who took part in last year's exchange.

Three Soviet botanists are scheduled to arrive in the United States in July. After visiting the New York Botanical Garden, they will leave on a study and plant collection trip to Colorado, Utah, and Wyoming, concentrating on upper montane, alpine, and subalpine plants. Before returning home, the Soviet scientists are scheduled to visit the Cary Arboretum.

In late August a team of three American plant experts will leave for a reciprocal visit to the Soviet Union. Robert Hebb, horticulturist of the Cary Arboretum, will represent this organization. The others in the group will be Dr. Theodore Crovello, University of Notre Dame, and Dr. Dedrick Wilken, Colorado State University. The three American scientists expect to travel to Middle Asia where they will concentrate their research in forest areas of the Tien-Shan Mountains. Among cities they will visit are Tashkent and Alma-Ata.

The Soviet scientists scheduled to visit this country under Arboretum auspices are: Dr. Valery I. Nekrasov, Chief of the Department of Exchange and Seed Investigation, Main Botanic Garden, Moscow; Dr. Lilian S. Plotnikova, Senior Scientist, Main Botanic Garden, Moscow; and Dr. Igor V. Belolipov, Senior Scientist, Tashkent Botanical Garden, Uzbek Academy of Sciences.

Fern Collection Planned at Cary

For the past several years the staffs of the Arboretum and the New York Botanical Garden have hoped to establish an important collection of ferns in the beautiful hemlock ravine that borders the East Branch of the Wappingers Creek near the stone bridge on the eastern side of the Arboretum grounds. Now the "Fern Glen," as it will be called, is fast becoming a reality, thanks to the dedicated work of several fern enthusiasts and a grant recently received from IBM.

Because of the interest of Mr. Edward L. Linde, an IBM official who is active in the American Fern Society, IBM has made a Community Service Grant of \$1,500 to help defray costs of establishing the fern collection.

Dr. John Mickel, fern curator at NYBG - Bronx, working with NYBG Senior Vice-President Carlton Lees and Arboretum

Horticulturist Robert Hebb, has already staked out the proposed fern area. Located in a beautiful boggy swale on the edge of the hemlock grove, the Fern Glen will be enhanced with footpaths, bridges, and other amenities.

Spores for the fern collection already are being germinated in the Arboretum greenhouse. Members of the American Fern Society will be deeply involved in helping to furnish plants, labor, advice, and possibly additional funds. Volunteers will play a major role in development of what will become a unique area at the Arboretum.

The site will be used to display a very wide representation of native ferns, other hardy ferns from around the world, and to test the hardiness of numerous fern species not grown in this area before. Eventually it is hoped that the Cary Fern Glen will have the

largest collection of hardy ferns in the Northeast.

A limestone cobble area will be constructed for fern species which require alkaline soil conditions, and a small pond will be dug as a landscape feature and also to provide appropriate conditions for several fern allies which need open water or boggy pond edges for best growth.

Native swamp azaleas and other associated plants will be incorporated to enhance the beauty of the area. Trails through the Fern Glen and initial plantings should be open for public visitation by next spring. As work on the Fern Glen progresses, the Arboretum also hopes to develop a series of other trails and native plant walks for the public in the same general area.

Around the Arboretum

Mickey Sees the Arboretum

Mickey Mouse has his eye on us! Recently, a representative of Disney World saw the Cary Arboretum film "A Gift of Land" at the annual meeting of the American Association of Botanical Gardens and Arboreta and requested a copy for use at Disney World. Mickey's helpers now are enjoying an inside look at the work of the Arboretum. Incidentally, the film has received over 55 showings, including one at the Bardavon Theatre in Poughkeepsie.

Wednesday Visits

Regular visiting hours at the Arboretum started off auspiciously on May 11, with nearly 40 people taking the first tour. These weekly visits start at the Greenhouse on Route 82 every Wednesday afternoon from 1:30 to 4:30 p.m. Volunteers Flo

Fried, Julia Schreiber, and Win Boeckel have been doing an outstanding job as guides in the Greenhouse. In addition, visitors receive a map and booklet they can follow for a self-guided tour to various points of interest via the internal road system. The tours are free to members of Friends of the Cary Arboretum, \$1.00 for non-members, and 50¢ for children and senior citizens.

Karnosky Appointment

Dr. David Karnosky has been elected co-chairman of a working committee of the International Union of Forestry Research Organizations, assigned to coordinate worldwide research efforts on species and varieties of trees that are resistant to air pollution. The honor is an outgrowth of Dr. Karnosky's attendance last year at a world congress on this subject in Oslo, Norway.

Disease Identified

Seven years ago a fungal disease that severely affects large red and Scotch pines was first spotted in Franklin County, New York. The disease now is slowly spreading in other northern counties. The latest issue of "New York Forester," published by the New York section of the Society of American Foresters, gives credit for the first identification of the disease in 1973 to Dr. Edson C. Setliff, who is now forest pathologist on the Cary Arboretum staff. Dr. Setliff cooperated with an inter-governmental team, represented by Mr. James Sullivan of the New York Department of Environmental Conservation and Mr. John Thompson of the U. S. Forest Service. Studies are now being considered to better understand the biology and control of the destructive pest.



To honor Arbor Day, April 29, 1977, a hybrid elm tree from the Cary Arboretum of the New York Botanical Garden in Millbrook, New York, was planted at the U. S. Capitol. Commemorating the event are (left to right): Dr. Thomas S. Elias, an Assistant Director of the Cary Arboretum; Representative Frederick W. Richmond (D-NY); Senator C. W. Bill Young (R-FL); Representative James H. Weaver (D-OR); Senator Jacob K. Javits (R-NY).

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